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ABSTRACT

The primary purpose of this study was to identify school attributes that are associated with cognitive achievement and other selected student behaviors. The data were drawn from the base year survey of High School and Beyond, a national longitudinal study sponsored by the National Center for Education Statistics. More than 30,000 sophomores and 28,000 seniors in 1,015 high schools across the country were administered questionnaires and tests in spring 1980, and school administrators also completed questionnaires. Data from all these sources were used in the present study. Using schools as the unit of analysis and sophomore data as proxy measures of seniors' entry behaviors, the analysis revealed that the number of science and mathematics courses offered, the percentage of students in academic programs, and the number of discipline rules enforced in school are positively and significantly related to student test scores. This seems to suggest that schools that have orderly environments and offer an adequate academic curriculum produce higher achieving and better behaved students. One noteworthy finding is that private schools are not necessarily better than public schools with respect to cognitive outcomes when other school characteristics and student backgrounds have been taken into account. (Author/PGD)

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EFFECTIVE HIGH SCHOOLS: WHAT ARE THEIR ATTRIBUTES?

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Abstract

The primary purpose of this study was to identify school attributes that are associated with cognitive achievement and other selected student behaviors. The data were drawn from the base-year survey of High School and Beyond, a national longitudinal study sponsored by the National Center for Education Statistics (NCES). This survey involved more than 30,000 sophomores and 28,000 seniors of 1980 in 1,015 high schools across the country. These students were administered questionnaires and tests in spring 1980. School administrators completed a school questionnaire. Data from both students and school administrators were used in this study.

Using schools as the unit of analysis and sophomore data as proxy measures of seniors' entry behaviors, the analysis revealed that the number of science and mathematics courses offered, the percentage of students in academic programs, and the number of discipline rules enforced in school are positively and significantly related to student test scores. This seems to suggest that schools that have orderly environments and offer an adequate academic curriculum produce higher achieving and better behaved students. One noteworthy finding is that, contrary to the recent popular notion, private schools per se -- mostly Catholic schools in this study -- are not necessarily better than public schools with respect to cognitive outcomes when other school characteristics and student backgrounds have been taken into account.

Effective High Schools: What Are Their Attributes?

Background and Purposes of the Study

Educational researchers and policymakers as well as the general public want to know what kinds of schools are most effective in fostering excellence in education. What makes one school better than another? Is it school facilities, teachers, curricular programs, school control, or student body composition? Answers to these questions may help identify the best ways for improving education; may shed light on such matters as student test score decline, school crime, and discipline problems; and could provide a basis on which parents might choose one school over another for their children.

While many researchers have addressed these concerns, their answers have not always been consistent. In the late 1960s and early 1970s, a number of researchers concluded that school variables have little impact on student learning after student home environment and mental ability are taken into account (e.g., Coleman et al., 1966; Jencks, et al., 1972; Jensen, 1969; Averch et al., 1972). In recent years, several researchers, however, have reported contrary findings to the effect that school variables, as well as student and home variables, do influence student outcomes (Bridge, Judd & Moock, 1979; Rutter, Maughan, Mortimore, & Ouston, 1979; Brookover et al., 1979; Madaus, Airasian, & Kellaghan, 1980). For example, Bridge et al. (1979), after reviewing of 15 years of input-output research in education, concluded that "many characteristics of schools, teachers, and student bodies have been found consistently to affect educational outcomes. Admittedly, these inputs may have relatively smaller effects than do the characteristics of families and individuals, yet these inputs are subject to the control of policymakers and therefore deserve attention" (p. 286). Madaus et al. (1980)

concluded that "a school climate characterized by social rewards for academic excellence, where discipline and scholastic achievement are valued by teachers and students, and teaching and learning are structured and focused on scholastic goals, contributes to high student achievement" (p.189). Other studies indicate that amount of homework required (Takai, 1982), and the number of math courses taken (Welch, Anderson, & Harris, 1982) significantly account for differences among students in their test scores.

The lack of consistent findings regarding the impact of school variables may result from the ever-changing process of teaching and learning and from the lack of comparability among certain studies. Nevertheless, it points up the need for a systematic study to address the questions raised earlier; a study that will take into account differences in home background, in-school variations, and the initial entry ability of the students, and will include test scores and other student behaviors as outcome measures of schooling.

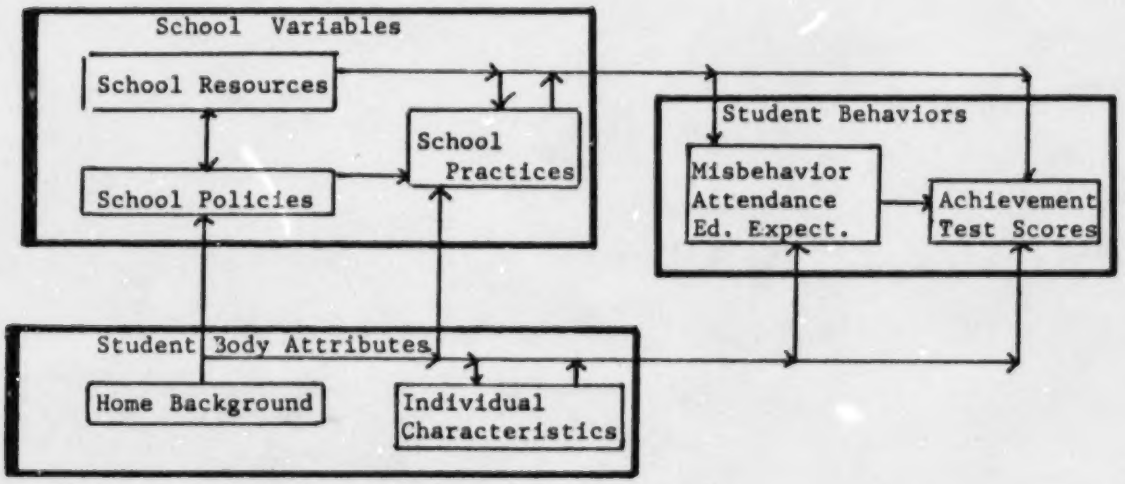
A recent national survey entitled High School and Beyond (HS&B) has provided an opportunity to carry out such a study. HS&B is a longitudinal study sponsored by the National Center for Education Statistics, within the Office of Educational Research and Improvement, U.S. Department of Education. The study used a national probability sample of 1,015 schools with up to 36 sophomores and 36 seniors randomly selected in each school. In spring 1980, an administrator in each sample school completed a questionnaire about school characteristics and practices. Students completed a questionnaire and a battery of tests including reading, vocabulary, mathematics, and science. The school and student surveys together yielded a rich data base for examining the relationship between school characteristics and student outcome measures.

This study is one of many analyses that explored the rich HS&B data base. Its primary purpose is to investigate the question of whether schools make a difference in student achievement test scores and other behavior measures and whether such school variables as curricular programs, discipline rules, school practices, teacher characteristics, and social, psychological, and physical environments significantly account for the differences.

Conceptualization of the Process of Education

To address the above question, it is helpful first to conceptualize how a school brings about student learning. The process is complex. It involves interrelated resources and events that are intended to motivate, shape, and elicit certain student behaviors. This process is depicted in Figure 1. Clusters of related variables are boxed, and the arrows indicate the direction of the functional relationships.

Figure 1. Process School Education



The process, as shown in the Figure, depicts the interactions within and among three types of variables: school variables, student body attributes, and student behaviors. School variables include school policies, school resources, and school practices. They generally define what a school attempts to provide. Student body attributes indicate what students bring into the school. To a large extent, they reflect students' home backgrounds and other socioeconomic characteristics. Both types of variables will independently and jointly affect the outcome of education as measured by the student behaviors.

Probably most important in determining the character of a school is its policies regarding administrative procedures, educational goals, graduation requirements, standards of student conduct, etc. To some extent, these policies reflect the values of the community, and set directions for allocating school resources and for determining school practices. In this study, school policies are represented by some direct measures, such as the use of minimum competency graduation requirements, and some proxy measures, such as type of control (public vs. private). These variables, however, may not accurately reflect all of the variations in policies among schools. For example, differences in school autonomy are probably greater among public schools than between public and private schools.

School resources include both physical facilities and personnel that are available to students. It is assumed that better resources provide greater opportunities for students to learn. Better resources may also help to create a psychological environment conducive to learning. In this study, resources include school facilities, student/teacher ratio, teacher qualifications, school size, and the number and kinds of courses offered by the school.

School practices refer to the ways that school policies are implemented in the effort to give students meaningful educational experiences. In this study, the following aspects of school practices are examined: type of curriculum, school rules and their degree of enforcement, amount of homework, extra-curricular activities, and specific instructional procedures such as ability grouping and remedial work for slower learners.

While the above school variables will greatly influence the nature and the quality of a school, the type of students enrolled in the school is also a potent influence. Previous studies have shown that such student body attributes as racial composition, family background, parental expectation, and parental involvement in school, have a significant impact on student performance (Averch et al., 1972). These attributes not only are related to the individual's ability and aspirations, but also can create a type of peer group subculture that influences student behavior and learning.

Student behaviors are assumed to be partially the result of the particular instructions and guidance they have received. In most educational research, the outcome is measured by achievement test scores. This study utilizes not only test scores but also measures of school attendance, educational expectation, and student misbehavior. These behavior measures are assumed to be related to test scores.

To summarize, education is a process that involves many interrelated variables. It is hypothesized that many of these variables can be used to characterize those schools where students exhibit desirable behavior patterns and achieve high test scores. The variables included in the study are listed below. Their definitions and measurement scales are presented in Appendix A.

A. School Variables

School policies: school type (public vs private), minimum competency requirements

School resources: school size, quality of facilities, student/teacher ratio, percent of teachers with advanced degrees, teacher turn-over rate, number of courses offered

School practices: curricular program, number of discipline rules, effectiveness and fairness of discipline, ability grouping, amount of homework, extra-curricular activities, total time of schooling

B. Student-Body Attributes

Family background: socioeconomic status, parental involvement, parental press

Student characteristics: percent black or Hispanic

C. Student Outcomes

Test scores: composite of reading, vocabulary, and mathematics test scores

Other behaviors: school attendance, misbehavior, educational expectations

Analysis Strategies

Certain general features of the analysis strategy, which were necessary because of the complexity of the issues investigated, are described as follows:

The use of schools instead of individual students as the unit of analysis. Since the focus of the study is on identifying the characteristics of effective schools, schools rather than individual students were used as the unit of analysis. This presented no major problems. Most of the school data used were obtained from school administrators or their designated representatives. The student data which were aggregated to represent a school provided unbiased estimates because students in each school were randomly selected. It should also be noted that the number of students in each school was sufficiently large to provide reliable estimates (up to 36 seniors and 36 sophomores per school).

The use of composite rather than individual test scores. In view of the fact that the HS&B tests are relatively short, the scores on three tests (reading, vocabulary, and math) were combined to maximize their overall validity and reliability. The mean composite score within each school was used in the analysis.

The use of sophomore data as proxy measures for seniors' entry level. In examining the effects of school characteristics on the achievement of seniors, it is necessary to control for differences between schools in the initial achievement levels of their beginning students. Since initial achievement levels of seniors are unknown, the scores of the sophomores were used as proxies, and as a covariate in the analyses.

The use of multiple statistical analyses. The following analyses were performed: multiple regression of the full model (i.e., an analysis including all variables specified earlier); step-wise regression analysis; and two-stage regression analysis. The full model analysis gives estimates of the total variance accounted for by both the school and student-body variables. The

estimated regression coefficients ($\hat{\beta}$) then show the importance of each variable in explaining student outcome measures after all other variable in the model have been considered. The step-wise regression procedure was used to estimate the incremental variance accounted for by all school variables after all student-body attributes were entered. It was also used to estimate incremental variance account for by each individual variable. Finally, a two-stage procedure was used to determine: 1) the proportion of residual variance explained by school variables, and (2) which school variables explained most of the residual variance. The first step in the latter analysis involved calculating the residual variance by first predicting test scores using student-body attributes, and then calculating the differences between the predicted and the actual observed scores. The difference scores were then analyzed. In all regression analyses, listwise deletion was used in treating missing data.

The Use of Sampling Weights. The HS&B sample of schools is highly stratified. Each school was selected with a different probability. Thus, in order to obtain unbiased estimates of the population values, the survey data must be properly adjusted using sampling weights. The weights are the inverse of selection probabilities. In computing variable means, for example, the following formula was used: $\bar{x} = \sum(w_i x_i)/\sum w_i$, where x_i is the measure of the ith school, and w_i is the sampling weight of the ith school. The same principle applies to computations of standard deviations and correlations.

Results

Do schools make a difference? The means, standard deviations, and correlations between predictor and criterion variables are shown in Table 1. The number of schools that had data for some of the selected variables is less than 1,015 due to item nonresponse or because some schools in the sample did not have senior classes in 1980 (992 had senior class). All student-body attributes are highly related to senior test scores; the correlations range from .35 for parental press to .76 for socioeconomic status. However, many school variables such as school type, facilities, courses offered, curricular program, amount of homework, and effectiveness of discipline, also are highly related to test scores ($r > .20$). Similar relationships exist between the predictor variables and educational expectations. However, the relationships between the predictor variables and student absenteeism as well as misbehavior are generally weak but in the expected directions. For example, students in academic programs and in schools where discipline was considered effective are less likely than other students to report misbehavior and to be absent.

The above descriptive statistics give some indications of the predictive power of individual variables. A question of interest is: how important are school variables in determining student behavior after student-body attributes are accounted for? To answer this question, multiple regression analysis was performed by entering student-body attributes first, and then determining the contribution of school and other student variables. The results are presented in Table 2. Student-body attributes and sophomore test scores (as proxy measures of the initial entry level of achievement) together accounted for about 76 percent of the school variation in senior test scores. The addition of school variables accounted for an additional 7 percent of the total school variation. This suggests that schools do make a significant difference in

student achievement; in contrast, student-body attributes account for about 4 percent of the differences among schools. It should be noted, however, that the entry level of achievement (i.e., sophomore test) explains most of the variance. This means that students' earlier achievement level greatly determine the degree of learning in high schools.

The above finding on school effects was further supported by the results of a two-stage regression analysis. In this analysis, student-body attributes and sophomore test scores were used to predict senior test scores. The regression function for this prediction is presented in Table 3. The predicted test scores were then compared with the actual observed scores. The differences (residuals) not explained by the student background and the initial entry behavior, were then regressed onto the school variables selected for the study. The results show that about 13 percent of the residual variance was accounted for by the school variables, supporting the finding of Table 2 that schools do have signficant impact on student achievement (see table 4).

What makes a school different? To answer this question, results of two types of analyses were used. The multiple regression analysis including both school and student-body attributes was used to provide $\hat{\beta}$ weights which show the relative importance of each variable after all other variables in the model are considered. The results of this analysis are presented in Table 5. On the basis of $\hat{\beta}$ weights, socioeconomic status and percent black or Hispanic in the school remain as important predictors. Among school variables, the percentage of students in an academic curriculum stands out as the most important variable for predicting test scores. This is followed by the number of mathematics and science courses offered by the school and school type. It is interesting to note that the regression coefficent for school type is

positive, indicating that public schools have higher senior test scores than private schools after all other variables in the model are accounted for. Curricular program is also the strongest predictor for student behavior and educational expectation: schools that have more students in the academic program have a smaller problem of student absenteeism and misbehavior; and their students tend to have higher educational expectations.

The above findings are basically consistent with the results of the two-stage regression analysis shown in Table 4. In that analysis, academic program, type of school, type of courses offered in school are all significantly related to test scores. In addition, participation in intellectual extra-curricular activities stands out as an important variable for predicting senior test scores.

Results of step-wise multiple regression analysis also support the above findings. As mentioned earlier, step-wise multiple regression analysis was performed to identify variables that can add a significant contribution to the prediction of senior test scores. In this analysis, the variable accounting for the most variance was entered into the regression first, then the variable with the next highest contribution, and so on until further additions yielded no significant increase in predictive power. (This study used one-tenth of 1 percent of the school variance accounted for as the cut-off point; it is equivalent to about .5 point in test scores.) The results are shown in Table 6. Not suprisingly, the sophomore test scores are the best predictor of senior test scores, indicating that what students bring into school initially will greatly impact later outcomes. Socioeconomic status, and percent black or Hispanic in the school remain in the model, indicating the importance of student characteristics in predicting student achievenment. Among school

variables, curricular program and the number of mathematics and science courses offered in the school again show strong relationships with student achievement. Effectiveness of school discipline, artistic activity, minimum competency requirement, and discipline rules also show a slight relationship with student achievement.

Conclusion and Discussion

Differences among schools in senior student test scores and other behaviors are, to a large extent, attributable to student-body characteristics. That is, students' socioeconomic background and parental involvement account for a significant proportion of the school differences. However, the results show that school variables account for an even greater proportion of differences among schools. In particular, the number of science and mathematics courses offered, the total time for schooling, and school discipline, as well as the proportion of students in an academic program are significantly and positively related to student achievement. This seems to suggest that schools that have orderly environments and offer an adequate academic curriculum, as one would expect, will produce higher achieving students. One noteworthy finding is that, contrary to the recent popular notion, private schools per se -- mostly Catholic in this study -- are not necessarily superior to public schools with respect to student test scores after other school characteristics and student background have been taken into account.

Although these findings may raise more questions than they answer, they do have several potential implications for school administrators and policy-makers. Effective schools, as measured by academic achievement, seem to be

those that emphasize academic courses and the maintainance of an orderly environment. It is possible that the recent trend of declining test scores is partially the result of a diminishing emphasis on academic courses. Perhaps it is time for school policymakers to closely examine their course offerings and their discipline policies.

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Table 1. Means, standard deviations, and correlation of predictor and criterion variables

Variable 1/	Sample size	Mean	S.D.	Correlation 2/ Exp.	Abs.	Misb.	Test
Student-Body Attributes							
Average SES	1,015	-.07	.42	.72	.17	-.13	.76
Parent involvement	983	2.58	.77	.34	-.06	-.13	.44
Parental press	992	15.51	1.11	.72	.09	.15	.35
% black or Hispanic	959	14.58	24.54	.07	.06	.18	-.46
School Variables							
School type (public=1)	1,015	.77	.42	-.50	.04	.05	-.37
Compentency require.	976	.18	.38	.09	.09	.05	.06
School size	927	632	642	.16	.21	-.05	.06
Facilities	988	3.81	2.02	.34	.06	-.06	.28
Student/teacher ratio	925	13.23	14.61	-.03	-.02	.05	-.02
% teachers MA, MS, PhD	963	37.80	22.92	.29	-.03	-.03	.19
Teacher turn-over rate	972	11.14	14.34	-.05	.05	.19	-.09
# math science course	988	4.96	1.24	.32	-.10	-.13	.42
# other courses	988	7.21	2.80	.23	.14	-.09	.28
Total hrs in school yr	988	825.29	226.97	-.10	-.09	-.12	-.11
Curriculum (academic=1)	992	.35	.26	.77	-.10	-.22	.68
Discipline rules	988	2.43	.67	.00	-.17	.01	.01
Effective discipline	1,015	2.36	.28	.25	-.12	-.17	.20
Ability grouping	976	.82	.88	.11	.12	-.02	.05
Amount of homework	992	3.45	1.31	.56	-.15	-.13	.46
Activity-intellect.	992	1.26	.56	.17	-.14	-.03	.03
Activity-artistic	992	.77	.40	.16	-.20	-.18	.20
Activity-sport	992	1.18	.42	.28	-.13	.00	.30
Activity-community	992	1.25	.54	-.17	-.18	-.11	-.21
Student Behavior--entry measures							
Ed. expectation(Exp)	1001	14.59	1.07	.76	-.03	-.08	.57
Absenteeism (Abs)	1001	50.14	3.70	-.06	.70	.27	-.19
Misbehavior (Misb)	1001	49.44	2.14	-.25	.26	.40	-.28
Sophomore test	973	50.09	4.36	.57	-.10	-.27	.84
Student Behavior--outcomes measures							
Ed. expectation(Exp)	992	14.77	1.11		.00	-.23	.68
Absenteeism (Abs)	992	49.93	3.27	.00		.23	-.07
Misbehavior (Misb)	992	49.85	2.04	-.23	.23		-.34
Senior test (Test)	963	49.50	4.42	.68	-.07	-.34	

1/ Variables are defined in Appendix A

2/ r >.07 or <.07 is significant at the .05 level.

Exp = educational expectation
Abs = absenteeism
Misb = Misbehavior
Test = Senior test scores

Table 2. Multiple regression analysis summary predicting achievement

Variable entered	R-square	Added variance (percentage points)
Sophomore test	.722	72.2
Student-body attributes	.756	3.4*
School variables	.827	7.1*
Other student behavior	.836	.9*
Sophomore test	.722	72.2
School variables	.789	6.7*
Student-body attributes	.827	3.8*
Other student behavior	.836	.9*

* indicates the increase is significant at the .05 level

Table 3. Regression coefficients for predicting senior test scores

Variable	Coefficient
Intercept	17.814
Sophomore test scores	.600
Socioeconomic status	3.081
Percent Black or Hispanic	- .007
Parental involvement	.038
Parental press	.126
R-square	.756

Table 4. Relationships between school variables and residual test scores

School variable	Simple correlation	Regression coefficient Standardized	Non-standardized
Intercept			-3.98*(1.21)
Academic program	.19*	.34*	2.76*(.49)
School type (public)	.05	.23*	1.19*(.30)
School size	.09*	.09	— --
Math & science courses	.21*	.17*	.36*(.09)
Other type of courses	.09*	-.13*	-.11*(.04)
Facilities	.09*	.03	.03 (.04)
Student/teacher ratio	.05	.06	.01 (.01)
Discipline rules	.04	.05	.17 (.11)
Ability grouping	.03	-.02	-.05 (.09)
Effectiveness of discipline	-.05	-.05	-.40 (.30)
Competency required	.05	.06	.31 (.20)
Teachers with advanced degree	.07*	-.00	— --
Teacher turn-over rate	-.06	.06	.01 (.01)
Total hours in school year	.12*	.03	— --
Amount of homework	.01	-.03	-.04 (.07)
Activity - intellect	.05	.11*	.42* (.19)
Activity - artistic	.10*	.06	.34 (.21)
Activity - sports	.06	-.02	-.09 (.21)
Activity - community	.10*	.04	.17 (.16)
R-square		.13*	.13*

1. The dependent variable is the residuals; that is, the differences between observed scores and the scores predicted by student-body attributes.

2. The correlation and regression analyses are weighted.

3. Standard errors are included in parentheses.

4. * indicates significance at the .05 level; -- indicates less than .005.

Table 5. Standardized multiple regression coefficients, senior cohort of 1980

Predictor Variables	Criterion Variables: Ed. Expect	Absent	Misbehavior	Senior test
Student-Body Attributes				
Average SES	.27*	.33*	-.04	.17*
Parent involvement	.00	-.06	-.04	.01
Parental press	.42*	.13*	.14*	-.00
% black and Hispanic	.07*	.04	.14*	-.20*
School Variables				
School type (public)	-.11*	.09*	-.08	.08*
Compentency require.	-.03*	-.01	.00	.04*
School size	.10*	-.11*	-.12*	.01
Facility	.05*	.01	-.05	.02
Student/teacher ratio	.01	-.03	.03	.02
% teachers MA, MS, PhD	.04*	-.09*	.08*	-.00
Teacher turn-over rate	-.05*	-.01	.08*	-.03
# math science course	.03*	.09*	-.05	.10*
# other courses	-.01	.06	.09	-.02
Time of schooling	.01	.05	-.07*	.03
Curriculum (academic)	.18*	-.20*	-.25*	.19*
Discipline rules	-.04*	-.05	.02	.05*
Effective discipline	-.08*	-.07*	-.17*	-.05*
Ability grouping	-.02	.02	-.01	-.02
Time for homework	.08*	-.12*	-.13*	.02
Activity-intellect.	.06*	-.05	-.13*	-.01
Activity-artistic	.07*	-.08*	-.02	.07*
Activity-sport	.07*	-.00	.04	.03
Activity-community	.01	-.01	-.06	.01.
Student Behavior -- entry measures (sophomore)				
Ed. expectation (Exp)	.02			
Absenteeism (Abs)		.60*		
Misbehavior (Misb)			.21*	
Sophomore test				.32*
Student Behavior -- outcome measures (senior)				
Ed. expectation(Exp)				.22*
Absenteeism (Abs)				-.00
Misbehavior (Misb)				.05*
R-Square	.87*	.57*	.29*	.84*

* Significant at the .05 level.

Table 6. Summary of step-wise multiple regression analysis predicting senior test score

Variable entered	R-square	Percent added variance
Sophomore test scores	.722	72.2%
Educational expectation	.779	5.7
Percent Black or Hispanic	.800	2.1
Math & science courses	.808	.8
Academic curriculum	.816	.8
Socioeconomic status	.820	.4
Artistic activity	.823	.3
Effectiveness of school discipline	.827	.4
Misbehavior	.828	.1
Discipline rules	.830	.2
Minimum Competency	.832	.2
Teacher turn-over rate	.833	.1
Ability grouping	.834	.1
Sport activity	.835	.1

APPENDIX A

Specification of Variables

The variables used in this study are grouped in three categories: school variables, student body attributes, and student outcome measures. They are specified as follows:

A. School Variables: These were extracted from the school questionnaire file unless otherwise indicated.

1. School type: Public schools were coded 1, and private schools (mostly Catholic) were coded 0.

2. Minimum competency requirements: Whether seniors are required to pass a minimum competency (proficiency) test in order to receive a High School Diploma. A value of 1 indicates presence of the requirement; a value of zero, its absence.

3. School size: Total number of students in grades 10 and 12.

4. Quality of facilities: Each of the following facilities, if present, contributed one point to a composite index of the quality of a school's facilities: indoor lounge for students, career information center, occupational training center, media production facilities, remedial reading center, Departmental offices, Teaching Resources Center for Teachers, Child or Nursery Care facilities, and student cafeteria.

5. Student/staff ratio: The ratio of the total school enrollment to the total number (or full-time equivalent) of school personnel, including student teachers, volunteers, security guards, etc.

6. Percent of teachers with advanced degrees: Percentage of the full-time high school teachers who have Master's or Doctor's degrees.

7. Teacher turn-over rate: The percentage of full-time high school teachers in a school at the end of the 1978-1979 school year who had since left for reason other than death or retirement.

8. Number of mathematics and science courses: Total number of the following courses offered by the school: second year algebra, calculus, chemistry, geometry, physics, trigonometry.

9. Number of other courses: The total number of the following courses offered in the school: auto mechanics, drama, driver training, economics, ethnic or black studies, family life or sex education, third year Spanish, third year German, third year French, home economics, psychology, Russian, wood or machine shop. The figure can range from 0 to 13.

10. Time of schooling: This was measured by the product of the following elements: number of days in a school year, duration of a standard class period (in hour), and the number of standard class periods the average student has each day.

11. Academic curriculum: The proportion of students in a school who reported themselves as in a college preparatory (academic) program. A college preparatory program (academic program) was coded 1; others, 0.

12. Discipline rules: Number of rules, from the following three, which are enforced in a school.

    - Students responsible for property damage
    - No smoking rules
    - Rules about student dress

    Scores can range from zero to 3.

13. Effective and fairness of discipline: Each student rated both the effectiveness and the fairness of discipline in his school, each on a 4-point scale. (1 = poor, 4 = excellent). The two ratings supplied by each student were averaged. The mean of all the student averages, within a school was then calculated to yield a composite rating for each school. The data for these calculations were extracted from the student questionnaire file.

14. Ability grouping: Whether a school used homogeneous ability grouping for either the 10th or the 12th grade English classes. A value of 1 means that homogeneous grouping was used, and 0, that it was not.

15. Amount of homework: Students were asked: Approximately what is the average amount of time you spend on homework a week? Values assigned to given responses categories are as follows:

Values	Response category
0	No homework is ever assigned.
0	I have homework, but I don't do it.
1	Less than 1 hour a week.
2	Between 1 and 3 hours a week.
4	More than 3 hours, less than 5 hours a week.
7	Between 5 and 10 hours a week.
10	More than 10 hours a week.

16. Participation in extra-curricular activities: Students indicated, on a 3-point scale, their extent of participation in each of a variety of extra-curricular activities (0 = no participation, 1 = participation and 2 = participation as a leader or officer). For purposes of this analysis, specific activities were grouped into four categories as indicated below. Scores of the activities of each student within each category were summed to provide an index of participation for that category. For each category, the index scores for all students from each school were then averaged to obtain a school index.

1). Intellectual Activities

- Honorary clubs
- School newspaper
- Subject-matter clubs
- Student government

2) Artistic Activities

- Debating or drama
- Band or orchestra
- Chorus or dance

3) Sport Activities

- Varsity sports
- Other sports

4) Community Activites

- Vocational education clubs
- Community youth clubs
- Church activities
- Junior achievement

B. Student Body Attributes

1. Socioeconomic status (SES): The SES index, which was based on student questionnaire data, is a composite of five equally-weighted standardized components: father's education, mother's education, parental income, father's occupation, and a household items index. The SES index can have any value between approximately -3 to +3. Mean value is zero.

2. Parental involvement: A measure of parental involvement in their children's schooling was calculated from responses to certain items in

the school questionnaire. The question asked: To what extent is each of these matters a problem in your high school? (a) Parents' lack of interest in school matters, and (b) Parents' lack of interest in students' progress. Each of these items had four response options ranging from "serious" (scored a value of 1) to "not to all" (scored 4). Responses to these two items were summed to yield a measure of parental involvement in each school. A high score indicates a high level of parental involvement.

3. Parental press: This term refers to the amount of pressure which the parents in the school exert upon their children to get a good education. It was not measured directly. Each student's indication of the highest level of education which his mother wanted him to reach was taken as a proxy measure of parental press. The scores (years of schooling) ranged from 11 to 20 (11 -- less than high school graduation; 20 -- Ph.D, M.D., or other advanced degree).

4. Percent black or Hispanic students: Percentage of students who are members of Black or Hispanic origin, as reported by school administrators.

C. Student Performance

1. Composite test score: The average of standardized scores made by each student on the following tests: vocabulary, reading, and mathematics. the mean of the standard scores was set at 50 and the standard deviation at 10. The reliability of the composite is about .90. The sophomores' scores and the seniors' score were standardized separately.

2. Absenteeism: A simple average of three measures, each standardized to a mean of 50, with a standard deviation of 10. Sophomore and senior scores were standardized separately. The three measures are:

   1) Number of days absent from school for any reason other than illness.
   2) Number of days late to school.
   3) Whether or not the students reported cutting a class every once in a while.

3. Misbehavior: A simple average of three measures, each standardized to a mean of 50, with a standard deviation of 10. Sophomore and senior scores were standardized separately. The three measures are:

   1) Have had disciplinary problems in school during the last year.
   2) Have been suspended or put on probation in school
   3) Have been in serious trouble with the law.

   A higher score indicates a higher likelihood of having behavioral problems.

4. Educational expectation: Students' own statement of the years of schooling he expected to obtain. The scaling is the same as that used for parental press.